

**AMENDMENTS TO THE CLAIMS**

The following listing of claims supersedes all prior versions and listings of claims in the application:

**Listing of Claims:**

1-28. (Canceled)

29. (Original) A substantially pure protein preparation comprising a polypeptide selected from the group consisting of:

- (a) a CatSper2 protein;
- (b) at least a transmembrane domain of a CatSper2 protein;
- (c) at least an extracellular loop of a CatSper2 protein;
- (d) at least a pore region of a CatSper2 protein; and
- (e) at least an epitope of a CatSper2 protein having high predicted antigenicity.

30. (Previously presented) A substantially pure protein preparation as in claim 29 wherein said polypeptide comprises an amino acid sequence selected from the group consisting of:

- (a) SEQ ID NO: 2;
- (b) SEQ ID NO: 4;
- (c) SEQ ID NO: 6;
- (d) residues 104-126, 146-166, 176-195, 206-228, 241-262, and 316-340 of SEQ ID NO: 2;
- (e) residues 104-126, 146-166, 176-195, 206-228, 241-262, and 316-340 of SEQ ID NO: 4;
- (f) residues 102-124, 144-164, 174-193, 204-227, 239-260, and 314-338 of SEQ ID NO: 6;
- (g) residues 127-145, 196-205, and 263-315 of SEQ ID NO: 2;
- (h) residues 127-145, 196-205, and 265-315 of SEQ ID NO 4;
- (i) residues 125-143, 194-203, and 261-313 of SEQ ID NO 6;
- (j) residues 280-303 of SEQ ID NO: 2;

- (k) residues 280-303 of SEQ ID NO: 4;
- (l) residues 278-301 of SEQ ID NO: 6;
- (m) residues 266-275, 386-400, 447-458, and 482-494 of SEQ ID NO: 2;
- (n) residues 66-99, 266-275, and 394-414 of SEQ ID NO: 4; and
- (o) residues 64-89, 262-275 and 562-588 of SEQ ID NO: 6.

31. (Previously presented) A substantially pure protein preparation comprising a polypeptide comprising an amino acid sequence having at least 80% amino acid sequence identity with the amino acid sequence of a polypeptide selected from the group consisting of:

- (a) a CatSper2 protein;
- (b) at least a transmembrane domain of a CatSper2 protein;
- (c) at least an extracellular loop of a CatSper2 protein; and
- (d) at least a pore region of a CatSper2 protein.

32. (Previously presented) A substantially pure protein preparation comprising a polypeptide comprising an amino acid sequence having at least 80% amino acid sequence identity with the amino acid sequence of a CatSper2 protein and having CatSper2 activity in a cell capable of expressing CatSper2 activity.

33-40. (Canceled)

41. (Original) A method of identifying a potential modulator of CatSper2 activity comprising:  
contacting a candidate compound with a cell expressing a CatSper2 protein;  
measuring an indicator of CatSper2 activity in said cell;  
determining whether said candidate compound caused an increase or decrease in said indicator relative to a reference level; and  
identifying said candidate compound as a potential modulator of CatSper2 activity if said compound causes an increase or decrease in said indicator.

42. (Canceled)

43. (Original) A method as in claim 41 wherein said indicator is an indicator of the level of CatSper2 protein.

44-45. (Canceled)

46. (Previously presented) A method as in claim 41 wherein said cell has been transformed with a genetic construct which expresses a CatSper2 protein.

47. (Canceled)

48. (Original) A method of identifying a potential modulator of CatSper2 activity comprising:

contacting under physiological conditions a candidate compound with a CatSper2 moiety comprising at least a structural domain of a CatSper2 protein;

measuring binding, if any, between said candidate compound and said CatSper2 moiety; and

identifying said candidate compound as a potential modulator of CatSper2 activity if said candidate compound binds to said CatSper2 moiety.

49. (Original) A method as in claim 48 wherein said CatSper2 moiety is a polypeptide selected from the group consisting of:

- (a) a CatSper2 protein;
- (b) at least a transmembrane domain of a CatSper2 protein;
- (c) at least an extracellular loop of a CatSper2 protein; and
- (d) at least a pore region of a CatSper2 protein.

50-71. (Canceled)

72. (Original) A contraceptive preparation comprising a compound which decreases CatSper2 activity.

73-93. (Canceled)

94. (Original) A method of diagnosing an anti-CatSper2 antibody-mediated infertility caused by anti-CatSper2 antibodies present in a female urogenital tract comprising:  
obtaining a sample of antibodies present in a female urogenital tract;  
contacting said sample of antibodies with at least a fragment of a CatSper2 protein;  
detecting binding between said sample of antibodies and said fragment of a CatSper2 protein; and  
diagnosing an anti-CatSper2 antibody-mediated infertility if binding is detected between said sample of antibodies and said fragment of a CatSper2 protein.

95-111. (Canceled)